



California Public
Utilities Commission

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CALIFORNIA PUBLIC UTILITIES COMMISSION

Water Division

RATE DESIGN FOR WATER AND SEWER SYSTEM UTILITIES

INCLUDING MASTER METERED FACILITIES

Standard Practice U-7-W

San Francisco, California

July 2006

RATE DESIGN FOR WATER AND SEWER SYSTEM UTILITIES

A. INFORMATION NEEDED

1. After the revenue requirement has been determined (see Standard Practices U-3-W or U-3-SM), rates need to be designed to allow the utility the opportunity to collect the authorized revenues. In order to design water and sewer rates, the analyst needs the following information:

- (a) Revenue requirement
- (b) For metered rates, the amount of revenue requirement due to fixed costs (fixed costs are those that do not change with the amount of water delivered; fixed costs include profit)
- (c) Number of customers for each connection size
- (d) Expected annual water sales (water produced and purchased less unaccounted for water)
- (e) If rates are to be phased in, the amount of revenues approved for the first year and subsequent years¹

B. CALCULATING FLAT RATES

2. The Commission has long supported metering of water service² and state law requires that all new dwellings have water meters³. Also, either the utility or the customer, at their own expense, may install a meter⁴. Consequently there should be no new flat rate customers⁵. Normally the flat rate will be equal to the average bill for a metered customer of the same connection size unless the utility knows approximately how much water its flat rate customers use⁶, in which case, the flat rates should reflect the expected use.

3. Where more than one dwelling exists on the same property, the rate for the additional buildings should be the same as the rate for the first building unless the property has landscaping that

requires watering with utility water. In that case the flat rate for any additional buildings should be set at the average bill minus one-half of the average amount paid by metered customers for the water itself (one half of the average use times the commodity charge). If there are no metered customers use one half of the flat rate bill as a proxy for outside use.

C. CALCULATING METERED RATES

4. An Order Instituting Investigation (OII)⁷ was opened on November 21, 1984 to determine whether the existing rate design policy for water utilities resulted in a realistic and appropriate distribution of revenues between the service charge and consumption charge. There was no standard definition of fixed costs within the water industry at that time. The rate design policy was based on a service charge (to recover the costs associated with providing customers access to water) and the commodity charges (to recover the costs of the water delivered to a customer). Staff recommended a flatter rate design policy with the elimination of lifeline water service.

5. The OII resulted in D.86-05-064 of May 28, 1986, which modified water rate design as follows:

(a) A flatter rate design policy shall be adopted as statewide rate design policy for water utilities.

(b) The flatter rate design policy shall incorporate the following guidelines:

i. Service charges shall be set to allow utilities to recover up to 50% of their fixed cost.

ii. Lifeline rates shall be phased out.

iii. There may be multiple commodity blocks, with the number of commodity blocks to be limited to no more than three blocks.

iv. Seasonal rates may be applied in resort areas.

(c) This rate design was implemented by a memorandum⁸ that summarized the provisions of the new rate design. It noted that:

v. No customer should receive an increase more than twice the overall increase

vi. Service charges shall be set to cover 50% of fixed costs.

vii. For companies that presently have over 50% of fixed costs in the service charge, staff can discuss in the resolution why that percentage is justified (the decision did not order a reduction if fixed costs exceeded 50%)

viii. Calculate fixed costs by subtracting all variable costs from the revenue requirements. Variable costs included: Purchased power, purchased water, chemicals, income taxes, uncollectibles, any other cost which obviously varies with usage.

ix. The maximum number of commodity blocks is three. One block shall be used whenever possible.

x. Lifeline rates shall be phased out.

xi. Seasonable rates can be used in resort areas but only when no other equitable rate design is available.

xii. Staff must review conservation plans in each general rate case.

6. This rate design was reviewed in the Risk OII proceeding (I.90-11-033) and modified to allow recovery of 50% of the fixed costs in the service charge for Class A and B water companies, 65% for Class C and 100% for Class D⁹. When any regulated water utility acquires an inadequately operated and maintained small water utility, it may also design rates to recover up to 100% of the fixed costs in the service charge¹⁰.

7. D.85-06-064 also determined that the meter service charge ratios were out of date and directed the Water Branch to send a letter to all Class A water utilities proposing new ratios. Branch sent the letter on December 6, 1990 proposing to spread the service charge over the meter sizes in proportion to the maximum capabilities of the meters themselves to handle flows. The ratios adopted are in proportion to the upper limits of normal test flows as shown in G.O. 103, Section VI.3.b11. These ratios are as follows:

Meter Size Ratio

5/8x3/4 inch 1.0

3/4 inch 1.5

1 inch 2.5

1-1/2 inch 5.0

2 inch 8.0

3 inch 15.0

4 inch 25.0

6 inch 50.0

8 inch 80.0

10 inch 115.0

12 inch 165.0

14 inch 225.0

8. Where a larger size meter is required because the dwelling has a sprinkler system, the customer shall be billed at the rate calculated in Appendix B.

9. Because transitioning to these service charges may cause some customers to pay a higher than average rate increase, staff has limited rate design changes to provide that no customer will pay over twice the system average increase. This allows the water company to "phase in" to the service charge ratios given above.

10. Rates for water and sewer system companies that serve summer or vacation homes should be designed so that the transient customers pay their fair share¹² of the fixed and variable costs of the system. This can be done by imposing an annual service charge, paid in advance, and by metering and billing quarterly or monthly for water use¹³. The imposition of a full year of service charge, payable in advance, was upheld by D.86-05-066, May 28, 1986. If the home is sold in the first year, the original owner should get a refund of the apportionable amount (O.P. 2). Optional quarterly

payment plans are also required.

11. Calculate the service charge by first determining the amount of the revenue requirement that is a result of fixed costs, then multiply by the proper percentage to get the amount that needs to be recovered by the service charge. For Class A and B water companies the percentage is 50%, for Class C it is 65% and for Class D it is 100%. These dollars are then spread to different meter sizes as follows¹⁴:

SERVICE CHARGE ALLOCATION BY METER SIZE

Meter Size	Ratio
5/8 x 3/4 inch	1.0
3/4 inch	1.5 ¹⁵
1 inch	2.5 ¹⁶
1 1/2 inch	5.0
2 inch	8.0
3 inch	15.0
4 inch	25.0
6 inch	50.0
8 inch	80.0
10 inch	115.0
12 inch	165.0
14 inch	225.0

a. First multiply the number of services of each size by the ratios shown above to determine "meter-equivalents". Sum the products and divide the sum into the dollars to be spread. The result is the service charge for a 5/8x3/4 inch meter.

b. The other service charges are calculated by multiplying the charge for the 5/8x3/4 inch meter by the meter ratios.

12. On November 7, 1984 the Commission opened OII 84-11-013 to look into the reasonable of charging for fixed cost prospectively on an annual basis (Advance Annual Charge (AAC)). By D.86-06-066, May 28, 1986 the Commission determined that utilities charge must file within 60 days to allow alternate quarterly charges (AQC), to institute "compensatory" turn-on and turn-off charges (charges that included the foregone service charge in the turn-on charge) and to provide for crediting on a portion of the AAC or AQC to the seller and buyer when a home was sold during the year.

D. COMMODITY CHARGE

13. The commodity charge must recover the remaining revenues. Calculate this charge by dividing the remaining revenues by the expected annual sales.

E. CONSERVATION RATES

14. During times of drought or other shortage in water supply the Commission may adopt "increasing block" rates. This rate design sets a "reasonable" amount of water use and charges customers who use more than this amount a higher commodity charge (see D.00-03-053 for an example). These types of rate designs are much more volatile than the Commission's standard rate design and may also involve a revenue adjustment mechanism which tracks revenues and allows the utility to make up or give back revenues that were less or more than the adopted revenue

requirement.

F. TEMPORARY OR CONSTRUCTION WATER SERVICE

15. Temporary or Construction Water can be either flat rate or metered, preferably metered. It should be priced a little higher than regular water service. Because it is unpredictable, it is not part of the revenue requirement.

G. RATE SCHEDULE NUMBERING

16. New rate schedules should be numbered per Appendix A.

H. INTERNET PUBLICATION

17. Each Class A utility is required to publish its latest tariffs on its internet web site. The utility shall update its tariffs within five (5) business days of Commission approval.¹⁷

I. LIMITS ON RATE INCREASES

18. There is a Commission policy that puts limits on rate increases. It is described in a memo titled "CAPS Standard Procedure", dated February 22, 1983. It provides guidelines that allow a maximum of 50% increase in the first year, with step rates being authorized for the second year (that recovers accrued interest on the deferred revenues if that increase doesn't exceed 50%) and the third year to establish proper rates¹⁸. This process should be used only where the high rate increase also results in a high bill. Otherwise the customers will be confused about the rates to no good purpose.

J. RECOVERY OF PAST REVENUES

19. When the Commission allows water companies the opportunity to recover revenue from the time of the effective date of a decision or from the first day of the test year, calculate the lost revenue and the resulting surcharge as follows:

(1st test year revenue at authorized rates minus 1st test year revenue at present rates) times the number of days between the effective date of the rates and the effective date of the GRC decision plus 5 days and divide this product by the adopted annual sales times the number of years of recovery.

Lost Revenue = (Rev. at authorized rates -- Rev. at present rates)

Rev. at authorized rates = revenue calculated on actual sales during the time period at authorized rates

Rev. at present rates = Revenue collected during the time period in question

Surcharge = $\frac{\text{Lost revenue}}{\text{water consumption} \times \text{number of years for recovery}}$ = \$/Ccf

water consumption x number of years for recovery

20. The lost revenue is collected through a surcharge applied to the quantity rates over either a 12-month or a 24-month period depending on the amount of surcharge and its impact on the overall rate increase.

K. RATE DESIGN - SEWER

21. Sewer rate design is similar to flat rate water rate design, all similar customers should pay the same rate, and customers who pay different rates should do so based on differing costs to the utility to provide service. Sewer load may be estimated or calculated based on water use in the building.

L. UTILITY TAXES

22. Since the passage of Proposition 13, many municipalities have levied a "utility tax". This tax is usually collected as a percentage of the utility bill. These taxes should be a separate line item on the bill and shall only apply to the customers within the municipality imposing them.

M. UTILITY REIMBURSEMENT ACCOUNT

23. Sections 402 and 432 et. seq. of the Public Utilities Code require the Commission to assess a fee on each public utility it regulates. For water and sewer system utilities that fee is 1.4% of gross utility revenue. Gross utility revenue includes all surcharges and Safe Drinking Water Bond Act or State Revolving Fund revenues. It does not include utility taxes or charges that are set by and passed on to a governmental agency.

N. RATE DESIGN FOR MASTER METERED FACILITIES

24. Decision 01-05-058, May 14, 2001, sets out the rate design for master metered mobile home parks and apartment houses. Arguably, if the mobile home park or apartment house doesn't follow the following rate design rules, it is no longer exempt by Code §2705.5 from Commission regulation.

a. Mobile home parks that are provided water by Commission-regulated water corporations are exempt from Commission regulation if they charge "the rate which would be applicable if the user were receiving the water directly from the water corporation." This consists of both set charges (service charge and commodity charge) and apportioned charges (utility taxes and surcharges).

b. If the mobile home park has removed all capital carrying costs from its rental rates, it can charge individual service charges; if it has not, it must apportion to the submetered customers the actual service charge it pays.

25. The Commission has no jurisdiction over mobile home parks provided water by non-Commission regulated water suppliers or apartment houses that bill use Ratio Utility Billing System estimates of water use.

APPENDIX A - GUIDE TO NUMBERING RATE SCHEDULES

1. The rate schedule number will indicate the class of service as shown in the following tabulation. (These numbers have been selected to correspond generally to the revenue classes in the present uniform system of accounts for water utilities.)

Schedule

No. Class of Service

1. Metered service.
2. Flat rate service.
3. Irrigation service.
4. Private fire protection service.

5. Public fire hydrant service.
6. Resale service.
7. Service to governmental agencies.
8. Interdepartmental service.
9. Other water service (such as construction service).
10. Service to company employees.

2. Where appropriate, the number indicating the class of service will be followed by one or more of the suffixes shown below to further define the type of service covered by the schedule in those situation when the service rendered may be somewhat different than might be expected for the particular type of service.

Suffix. Type of Service

- A Annual service.
- C Construction service under Schedule 9.
- E Special Charges.
- F Flat rate service for other than service under Schedule 9.
- I Industrial service, under Schedule 9.
- L Limited service, as to area or customers.
- M Measured service for other than service under Schedule 1.
- O Optional service.
- R Residential service.
- S Seasonal service.
- T Treated water (other than service under Schedule 1 or 2) utilized for human consumption.
- U Untreated water for other than irrigation service.
- W Off season or winter irrigation service.
- X Temporary service.
- Z Surplus water sales.

3. When a tariff area has more than one rate zone (such as a lower and an upper elevation zone) each rate zone will be designated by a single identifying capital letter prefix followed by a hyphen placed ahead of the rate schedule number indicating the class of service. For example, the zone prefixes for the Valley Rate Zone and the Hill Rate Zone could be V- and H-, respectively,

followed by the class of service number and, where appropriate, the type of service suffix. If the utility has more than one system, the zone prefix will follow the system prefix.

4. For a water utility which has different rates established for its separately operated systems (such as districts or divisions of a multi-system utility) the rate schedule numbers applicable to each system will be further codified by use of a system prefix comprising the first two letters of the system's name (tariff area), both capitalized. This prefix will be separated from the remainder of the schedule number designation by a hyphen. If the names of two systems have the same first two letters, the second letters should be changed to other distinguishing letters that will maintain the alphabetical sequence of the full names. For example, the designations for Normandy and Norwalk could be NM and NW.

5. Where a rate schedule is universally applicable throughout all of the systems of a multi-system or district utility, the schedule number should have the prefix AA (applicable all areas), and the schedule heading should show that it is of general application, as follows:

(i) Schedule No. AA-9FC

(a) All Tariff Areas

**(i) CONSTRUCTION AND OTHER
TEMPORARY FLAT RATE SERVICE**

6. In rate schedules for individual systems of a multi-system utility, the schedule number will be followed on separate lines by the tariff area name (and rate zone, where required) and by the class of service title, as indicated below:

(ii) Schedule No. BAC - 3ML

(iii) Bakersfield Tariff Area

(a) Crest Zone

**(i) LIMITED MEASURED
IRRIGATION SERVICE**

7. Some examples of rate schedule numbers are:

Schedule No. 1 (metered service, single-system utility)

Schedule No. 2S (seasonal, flat rate service, single-system utility)

Schedule No. U-3F (flat rate irrigation service, upper zone,
single-

system utility)

Schedule No. BA-3M (Bakersfield tariff area, measured irrigation
service)

Schedule No. VA-9MI (Vacaville District, metered industrial
service)

Schedule No. SUH-1X (Suburban tariff area, Hill Zone,
temporary metered service)

8. The following material lists typical wording for the "applicability" portion of the rate schedule.

Schedule

No. APPLICABILITY

1 Applicable to all metered water service or sewer that uses metered water as the basis.

1A Applicable to all metered water or sewer service furnished on an annual basis

1S Applicable to all metered water or sewer service furnished on a seasonal basis.

2 Applicable to all flat rate water or sewer service.

2A Applicable to all flat rate water or sewer service furnished on an annual basis.

2LX Applicable to all flat rate water service furnished on a limited temporary basis.

2R Applicable to all flat rate residential water or sewer service.

2RA Applicable to all flat rate residential water or sewer service furnished on an annual basis.

2RS Applicable to all flat rate residential water service or sewer furnished on a seasonal basis.

2X Applicable to all flat rate residential water service furnished on a temporary basis.

3FL Applicable to all flat rate irrigation service furnished on a limited basis.

3M Applicable to all measured irrigation service.

3ML Applicable to all measured irrigation service furnished to the lands owned by John A. Doe as of January 1, 1942.

4 Applicable to all water service furnished to privately owned fire protection systems.

5 Applicable to all fire hydrant service furnished to municipalities, organized fire districts and other political subdivisions of the State.

6 Applicable to all water service furnished for resale purposes.

7F Applicable to all flat rate water service furnished to public parks.

9E Applicable to all service furnished under schedules for metered and flat rate water service. (For service establishment or other special charges.)

9FC Applicable to all flat rate water service furnished for general construction.

9M Applicable to all tank truck water sales.

9MC Applicable to all measured water service furnished for street paving, grading and trench flooding and for delivery to tank trucks.

10R Applicable to all residential water service furnished to regular and pensioned employees of the company.

Note: Other specialized schedules shall follow the same order of designation outlined above, i.e., first, flat rate or metered; second, purpose or use of water; third, limitations.

9. Some examples of territorial descriptions are given below. The phrase "and vicinity" will usually be included in the territory description.

1. TERRITORY

Los Altos and vicinity, Santa Clara County.

Keeler and vicinity, Inyo County.

Graeagle and vicinity, located approximately 12 miles southwest of Portola, Plumas County.

Tracts Nos. 1187 and 1188, and vicinity, located three miles north of Simi, Ventura County.

Tahoe Valley Center, Gardner Mountain Subdivision, Tamarack Subdivision and Tucker Subdivision, and vicinity, located in Tahoe Valley, El Dorado County.

Portions of Bellflower, Lakewood and Paramount, and vicinity, Los Angeles County.

Tracts Nos. 9389, 9775, 9856 and 1138, located in portions of Downey and Pico Rivera, and vicinity, Los Angeles County.

Method for calculating the surcharge over the $5/8 \times 3/4$ in metered service charge when the larger meter is needed for Fire Protection.

Workpaper for Advice Letter 1713

	5/8-inch		2-inch	
Price of Materials	\$	26.50	\$	209.00
Sales Tax	\$	2.25	\$	17.77
Cost of Installation				
Labor	\$	35.6 per person hour		35.6 per person hour
		0.5 hours		4 hours
Labor Cost	\$	\$ 17.80	\$	142.40
Benefits	\$	\$ 7.12	\$	56.96
Subtotal	\$	53.67	\$	426.13
Overhead	\$	4.29	\$	34.09
Total Cost	\$	57.96	\$	460.22

Product Life	25 years		10 years	
Depreciation Expense	\$	2.32	\$	46.02
Average Return on Investment				
	0.0864 Adopted ROR			
	1.4 Net-to-gross			
	0.12096 Revenue Requirement			
	\$	3.51	\$	27.83
Annual Cost	\$	5.82	\$	73.86
Difference in Cost			\$	68.03
Per Month			\$	5.67
5/8 inch rate			\$	10.30
Percent Surcharge				0.55
Rounded				50%

¹ D.60648, August 30, 1960, Crestmore Village Water Company

² D.328, November 2, 1912, Application No. 212, applicant permitted to substitute a meter rate in place of the existing flat rate charges, applicant originally to bear the cost of installing meters.

³ Water Code, Section 110

⁴ D.608, April 25, 1913, Finding of Fact 1.

⁵ If the utility can show that all residences are vacation homes and used only a few days per year, the staff may continue to allow flat rate service.

⁶ This requires at least some metered customers, so metered usage can be compared to flat rate usage.

⁷ Order Instituting Investigation I.84-11-041

⁸ Memorandum to all Water Branch Technical Personnel dated December 9, 1986 from Wes Franklin, Chief, Water Utilities Branch, Subj: Rate Design Policy Established by D.86-05-064.

⁹ D. 92-03-093, March 31, 1992, O.P. 6. Class A companies serve over 10,000 service connections, class B 2001 through 10,000, class C 501 through 2000 and class D 500 service connections or less.

¹⁰ D.99-10-064, October 21, 1999, Appendix D, para. 3.03 B

¹¹ January 18, 1991 Water Utilities Branch letter, "Rate Design Policy -- Service Charge allocation by meter size"

¹² see D.52450 dated January 4, 1956 in A.36896; D.52903 dated April 17, 1956 in A.37103; and D.58250 dated April 7, 1959 in A.40517

¹³ D.66729, January 28, 1964 in A.45164

¹⁴ Memorandum to Water Branch Staff from Fred L. Curry dated January 18, 1991, Subject: Rate Design Policy - Service charge allocation by meter size.

¹⁵ If the utility is installing $\frac{3}{4}$ inch meters on normal residential service either because it cannot purchase $\frac{5}{8}$ by $\frac{3}{4}$ inch meters or because it has chosen to do so, the ratio for $\frac{3}{4}$ inch meters should be 1.0.

¹⁶ If the local fire protection agency or County is requiring sprinkler systems in new homes and if the only reason for the larger meter is to provide adequate flow to the sprinkler system, then calculate a surcharge on the $\frac{5}{8}$ x $\frac{3}{4}$ rate using Appendix C.

¹⁷ D.01-07-026, July 12, 2001, Appendix A, para. 2.1

¹⁸ See also D.54818, April 9, 1957 in A.36646 and D.60648, August 30, 1960 in A.41961

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